

dyspnoea in which the circulation through the respiratory centre seems to be defective, and this is associated more especially with weakness of the left ventricle. There is no cyanosis, no evidence of any obstruction to air or blood in the lungs, and, in fact, no obvious reason why the patient should be intensely dyspnoic. If we recall the two diseases of the lung already referred to—broncho-pneumonia and lobar pneumonia—it will be found that the disturbances of respiration in them were traced to two different sources, one being pulmonary and the other in the respiratory centre. In the case of broncho-pneumonia the dyspnoea was directly due to obstruction of the air to the lungs and of the blood through the lungs.

THE DIAGNOSIS OF URINARY DISEASES IN CHILDREN.*

BY

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I PROPOSE to deal with this subject from the point of view of an investigation of symptoms indicating disease of the urinary tract. One, therefore, will have to consider the following disturbances of micturition: Dysuria, difficulty, enuresis, frequency, hæmaturia, pyuria, and pain or swelling in one or both kidney regions, in association with, or independently of, any of the above.

Dysuria is most conveniently considered together with frequency. In their order of importance the causes of these may be *Bacillus coli* or a coccal infection, calculus, urinary tuberculosis, foreign body in the bladder or urethra.

BACILLUS COLI INFECTIONS.

These are recognised as of two types, the acute and the chronic. The former manifesting the usual constitutional signs of an acute infection combined with obvious features indicating the urinary tract as the seat of the trouble, such as renal tenderness, marked frequency with distress on voiding, often with terminal hæmaturia. The urine has generally an abundance of pus cells, and the causal organism is obtained in pure culture. Gastro-intestinal disturbance, with nausea and vomiting, constipation, or diarrhoea frequently precedes and accompanies the attack, which responds readily to castor oil and alkalies.

The chronic form is not so easily dealt with and must be investigated with the greatest care, as there is frequently some more important factor underlying

This, with the accompanying cyanosis, is comparable to what may be called the pulmonary form of cardiac dyspnoea. In lobar pneumonia, on the other hand, there was no evidence of any pulmonary obstruction—to air or blood flow—and the disturbance was traced to stimulation of the respiratory centre, producing rapid breathing but no dyspnoea. So in the dyspnoea which accompanies failure of the left ventricle we may reasonably place the source of disturbance in the respiratory centre. Apparently this centre is not stimulated by anoxæmia, but is weakened, and sends an appeal to the higher centres for help. The response, unfortunately, does not seem to be of any great value in the relief of the condition.

the constant presence of the coliform organism in the urine, so that the diagnosis must not be considered complete until all the established methods of inquiry into the condition of the urinary tract have been made use of and other possible causes excluded. This applies especially to calculus which, if left long enough, will ultimately give rise to infection, which in 90 per cent. of cases will be coliform in nature.

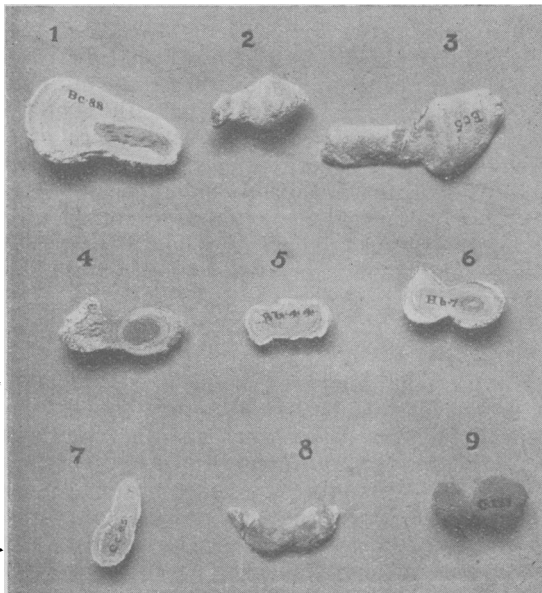
CALCULUS.

Calculus is much more common in the bladder than in any other part of the urinary tract in children, the greatest incidence lying between the ages of 3 and 7 years. The forefinger well lubricated and gently introduced into the rectum will allow of a satisfactory examination of the bladder of a child even as young as 3 years without making the patient cry, and will enable the examiner to readily detect a stone not much larger than a pea if the examination is made bimanually. Before withdrawing the finger careful palpation of the posterior urethra should not be neglected, as a stone may lodge in this region (see illustration). In front of the triangular ligament a urethral stone, or a point of tenderness in the bulb indicating the presence of a stone, can be easily palpated.

Whether or not this method is fruitful of a positive diagnosis a skiagram covering the whole urinary tract is essential, for the reason that if a bladder stone has already been detected the possibility of urinary concretions at a higher level is stronger than under the opposite circumstances. Renal stone in children is met with more commonly than in former days when the necessity of radiographic examination of the whole urinary tract was not considered so important. General anaesthesia is a routine necessity in all young children for radiography. The continued absence of the evidence of calculus by this means of inquiry does not completely absolve the investigator from further search, for the reason that bladder stone in children may consist largely of ammonium urate or uric acid, and both these substances having but a poor opacity to X ray may enable a small stone to escape detection. Fortunately, this likelihood is less in

* A Lecture delivered at the Children's Clinic.

the kidneys and ureter than in the bladder, which organ should be inspected with the cystoscope to clear up any lingering doubt.



Stones removed from the posterior urethra of children. Note their dumb-bell shape. This is due to the constricting effect of the internal urinary meatus, for these stones when quite small were originally impacted behind the compressor urethra and increased in size by enlarging backwards, ultimately projecting into the bladder.

URINARY TUBERCULOSIS.

Urinary tuberculosis in children, except as part of a generalised body infection, is not common. However, the nearer that adolescence is approached the more likely is this disease to occur. The danger of finding coliform bacilli in the urine, and of regarding these organisms as supplying the diagnosis, must be safeguarded by remembering that the colon bacillus and the tubercle bacillus are frequently together, and that the former is easy while the latter may be difficult to detect without special bacteriological methods.

Cystoscopic examination in most cases of urinary tuberculosis supplies evidence which puts the diagnosis beyond doubt without having to wait for a laboratory investigation. Having established the diagnosis one's line of treatment cannot be determined until a definite decision as to whether one kidney or both kidneys are the seat of infection. The appearance of one or of both ureteric orifices frequently makes it quite clear that the kidney above is infected, but it often happens that while on the one side the appearance is characteristic, on the other it is not. In order to determine the state of the corresponding kidney a ureteric catheter should be passed and some urine obtained. Although staining and cultural methods may fail to identify the tubercle bacillus in the resulting specimen, the presence of pus cells must raise a strong suspicion

of this infection, while the final decision should rest on the result of guinea-pig inoculation. A six weeks' interval is necessary for the proper carrying out of this method, but it is extremely reliable. The importance of pursuing this course to the end is too great to warrant neglect, for if the infection turns out to be bilateral it is incurable, whereas a unilateral case offers every hope of a complete recovery by operation.

Foreign Body.—In children about the age of puberty this cause of symptoms must be kept in mind in both sexes. Slate pencils, portions of tallow candle, hairpins, and matches have all been discovered in the bladders and urethras of children.

Frequency (without pain).—The polyuria of diabetes and chronic nephritis should not be forgotten in a case of this kind.

HÆMATURIA.

Painless hæmaturia is most likely due to a vesical papilloma, but there may be other causes, and for this reason an opportunity to cystoscope the patient while the bleeding is on must not be neglected, as delay may find the hæmorrhage ceased without any indication as to its source. When of renal origin chronic nephritis is, perhaps, the commonest cause of blood in the urine without pain. The presence of many renal casts, and the history of a predisposing infective complaint, especially if cystoscopy shows the blood coming from both ureters, is sufficient evidence to complete the diagnosis.

Other causes of renal bleeding, although often accompanied by pain in the kidney region, but not necessarily so, are polycystic disease, hydronephrosis, and stone. The first will cause no difficulty in diagnosis if bilateral and renal enlargement is palpable with the characteristic bosses on the kidney surfaces. The enlargement in some cases, however, is only sufficiently advanced on the one side to be felt.

Hæmaturia as the outstanding symptom of hydro-nephrosis is not so rare that it can be passed over without consideration. The most careful investigation of a possible case is enjoined for the reason that the congenital disease in children is frequently bilateral, and that while one side is obvious the other may not be, and is likely to be overlooked. Therefore, in the absence of some definite contra-indication pyelography should be carried out on each side on two separate occasions. As general anæsthesia is required for this procedure in children, and as a special technique is necessary for the introduction of the opaque medium into the kidney when the patient is not conscious, without which there is grave danger to the patient, such an investigation should only be attempted by one who is expert in this procedure. The treatment cannot be decided without first establishing the extent of the disease, for if it is bilateral nephrectomy must not be carried out, although nephrec-

tomy is the treatment of choice if the condition is unilateral.

Renal sarcoma must always be thought of in infants and young children with hæmaturia. As a rule, however, the hæmaturia is a terminal manifestation of the disease, and one is generally confronted with a wasted child with a swelling in the loin and copious blood in the urine; such cases are inoperable.

Scurvy rickets may give rise to renal bleeding before swelling of the bones is detected.

Difficult micturition, without pain, is due to either phimosis or to atresia of the external urinary meatus. In the former the outlet from the preputial sac may be no larger than a pin's head, causing the sac on micturition to balloon with fluid. Both conditions are easily dealt with by well-known minor surgical measures. Difficulty with pain should raise the suspicion of stone or foreign body in the bladder or urethra.

ENURESIS.

Children suffering from lack of complete voluntary control of the bladder may be divided into two groups according to whether the condition has persisted from infancy or whether it has come on later. In the majority of the latter group it is mostly at about the age of 6, the period of commencement of the second dentition, that the disturbance recurs. As a rule, the trouble has disappeared by the age of puberty. In every case of enuresis, especially when the symptoms have not persisted from infancy, the urinary tract should be the subject of most careful study, as there is always the possibility that there is present some definite disease such as stone. Polyuria of nephritis or diabetes, phosphaturia, uric acid excess, colon bacilluria, and causes of peripheral irritation such as balanitis, vulvitis, threadworms, or skin disease, must be sought and checked. Some cases are associated with mental weakness or epilepsy. In a certain proportion there is no cause which can be ascertained.

There is an unusual condition of bladder distension, accompanied by dilatation of both ureters and kidneys and which gives rise to overflow dribbling of urine. It occurs in children, and without any mechanical obstruction which can be identified. The pathology of the disease is obscure. It has been suggested that it is caused by congestion at the neck of the bladder.

Pyuria may accompany a number of pathological conditions of the urinary tract, but when this is the most prominent feature of a case—that is to say, that symptoms such as pain, frequency, difficulty, hæmaturia, &c., have been slight or absent—the pus is generally of renal origin. When due to some bladder condition, dysuria and frequency are the outstanding features.

RENAL ENLARGEMENT.

The diagnosis of the cause of this does not, as a rule, present any special difficulty in children. Polycystic kidney, sarcoma, and hydronephrosis

will have to be considered in all cases, any one of these may be bilateral, and likewise may give rise to hæmaturia. Copious bleeding in a child under 5 years, combined with the other clinical features characteristic of the disease, is generally enough to make the diagnosis of renal sarcoma.

In hydronephrosis, if the cystic nature of the condition is not appreciable, cystoscopy and pyelography, if necessary, will demonstrate the condition. In polycystic disease the irregular surface of the kidney, especially if both kidneys have this feature, makes the diagnosis easy. An enlargement without features which would characterise any of the above conditions calls for a radiogram to decide the question of stone, and if this is negative a tuberculous kidney will have to be considered.

CYSTOSCOPY IN CHILDREN.

The necessity for cystoscopy in a young child or an infant frequently arises, and the question naturally follows as to what age the child must attain before this procedure can be carried out. Children's cystoscopes are now made of such delicate dimensions that no infant's urethra is too small to prevent the passage of one of these instruments without fear of injury to the patient.

THE PATHOLOGY OF BRONCHIECTASIS

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THIS disease was first adequately described by Laennec at the beginning of the nineteenth century. Since then many accounts of it have been written of which the best in English text-books is still that of Fowler and Godlee in "Diseases of the Lungs," 1898.

Bronchiectasis consists of chronic dilatation of the bronchial tree.

ÆTIOLOGY.

The disease is rarely primary. The actual causes of its production may be divided into three classes: (1) those leading to distension of tubes from within, (2) those which cause weakening of the bronchial walls, and (3) those which pull on the bronchial wall from without. Fowler and Godlee give two classes, intrinsic and extrinsic, and in the former class place acute and chronic bronchitis, bronchial stenosis and obstruction, to which may be added chronic suppuration; and in the latter class, collapse of the lung, pneumonia, emphysema, and fibroid lung. Of all these causes, that of bronchial obstruction, especially when due to a foreign body, is the most likely to attract attention and is frequently placed first in the list, but as

Posted on MedRxiv first published as a preprint for peer review on September 19, 2016. <https://doi.org/10.1101/2016.09.19.16096101>